

REMARKS

Reconsideration of the present application, as amended, is respectfully requested. Claims 1-3, 7, 20, and 26 have been amended. No claims have been cancelled or added. These amendments do not add new matter. Therefore, claims 1-31 are presented for examination.

Applicants wish to thank the Examiner for the careful examination, and for finding claims 28-31 allowable. Applicants also wish to clarify that the term "uniform" as used in claim 28 refers to the "same," as noted on page 23 of the Specification, and does not mean "flat" which that term might mean to a person in the art.

Examiner rejected claims 1-27 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,584,216 to Nyul et al. in view of U.S. Patent No. 6,580,818 to Karssemeijer et al.

Applicants respectfully submit that Nyul and Karssemeijer cannot be logically combined. There is no suggestion in either reference for the combination suggested by the Examiner. Nyul describes an the MRI environment, which suffers from a lot of scanner-dependent variations even within the same body part and MRI protocol, Nyul discloses the concept of gray-scale normalization of MRI images to a "standard" form so that they will appear the same on a user display automatically, without requiring tone adjustments, regardless of the original MRI scanner equipment used. In the Nyul method, each MRI image is histogram-matched to a "standard" grayscale histogram for that "standard" body part image and "standard" MRI protocol. The "training" performed by Nyul is not CAD code training. Rather, the "training" performed by Nyul is simply to determine the parameters that will be used in the histogram matching. There is no mention of CAD detection of abnormalities anywhere in the Nyul reference.

Karssemeijer does discuss CAD processing, but discusses it in the context of detecting masses in a mammogram. There is no mention of normalization in Karssemeijer. It is solely using hindsight based on Applicant's own disclosure that this combination is made. Therefore, Applicants respectfully request the withdrawal of this rejection.

Additionally, claim 1, as amended, is not obvious over the combination of Nyul in view of Karssemeijer. Claim 1, as amended, recites in part:

providing a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first of said original sources;
defining a canonical contrast response curve based on the training image set and the first original source;

Neither Nyul, which does not discuss a CAD system at all, nor Karssemeijer, which does not discuss defining a canonical response, teach or suggest defining a canonical contrast response based on the training image set. Therefore, claim 1, and claims 2-6 which depend on it, are not obvious over Nyul in view of Karssemeijer.

Similarly, claim 7, as amended recites in part:

a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first of said original sources;
an image analysis system to define a canonical contrast response curve based on the training image set and the first original source, the image analysis system further to normalize a medical image to conform to the canonical contrast response curve regardless of an original format of the image;

Neither Nyul nor Karssemeijer, teach or suggest defining a canonical contrast response based on the training image set. Therefore, claim 7, and claims 8-19 which depend on it, are not obvious over Nyul in view of Karssemeijer.

Claim 20, as amended, recites in part:

a computer-aided detection (CAD) system configured to numerically process a medical image for identifying anatomical abnormalities therein, the CAD system having been trained using a training image set obtained from a first source;
a source of image data, each image in the image data having one of a multiplicity of spatial resolutions and a multiplicity of contrast responses;
a preprocessing module to normalize the image by transforming the image data into a “canonical” form with uniform contrast response, overall level and pixel size, the canonical form based on the training image set and the first source;

As noted above, neither Nyul nor Karssemeijer teach or suggest a preprocessing module to normalize the image by transforming the image data into a “canonical” form with uniform contrast response, overall level and pixel size, the canonical form based on the training image set and the first source. Therefore, claim 20, and claims 21-25 which depend on it, are not obvious over Nyul in view of Karssemeijer.

Claim 26, as amended, recites in part

a preprocessing module transforming the medical image into a “canonical” form with a universal contrast response, overall level, and pixel size, such that the contrast response of the medical image is the same as other medical images in said canonical form;

As noted by the Examiner with regard to claim 28, neither of the references teach or suggest such a preprocessing module. Therefore, claim 26, and claim 27 which depends on it, are not obvious over Nyul in view of Karssemeijer.

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit
account no. 02-2666.

Dated: _____

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Respectfully submitted,

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